PRINCIPES

Journal of the Palm Society

Vol. 2, No. 1
January, 1958

THE PALM SOCIETY

A non-profit corporation primarily engaged in the study of the palm family in all its aspects throughout the world. The Society relies on voluntary contribution for support, and membership is open to all persons interested in the family. Requests for information about membership or for general information about the Society should be addressed to the Executive Secretary.

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JOURNAL OF THE PALM SOCIETY

An illustrated quarterly devoted to information about palms published on the first day of January, April, July, and October, and sent free to members of the Palm Society.

EDITOR: Harold E. Moore, Jr.

EDITORIAL BOARD:
Paul H. Allen, David Barry, Jr., Duncan Clement, Walter H. Hodge, Eugene D. Kitzke, Harold F. Loomis, Nixon Smiley, Dent Smith.

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Cover Picture

Cuban *trepador* descending a royal palm after having trimmed off leaves and clusters of *palmiche*, Soledad (Cienfuegos), Cuba. Photo by W. H. Hodge.

Society News

1958 Palm Society Meeting

The biennial meeting of the Palm Society will be held this year on Thursday, April 17, in Miami, Florida. The Fairchild Tropical Garden has very generously offered their facilities at 10901 Old Cutler Road as a meeting place.

To make the biennial meeting doubly attractive it has been purposely scheduled for the day preceding April 18 when a special Palm Conference is to be held sponsored by the Fairchild Tropical Garden in cooperation with other organizations including the Palm Society.

All Palm Society members who possibly can are urged to attend what should prove to be an outstanding two-day program. Details of the meetings follow.

Biennial Meeting of the Palm Society

Thursday, April 17, 1958

10:00 A.M. Registration followed by walking tour of Fairchild Tropical Garden palm section.

Noon Lunch.

1:30 P.M. Biennial Meeting. Reports, election of officers, other business. Auditorium, FTG.

3:00—5:00 P.M. Tour of the Alvin R. Jennings estate, to see the palm collection of the late Col. Robert H. Montgomery. Light refreshments served.

7:00 P.M. Palm Society Banquet.

8:30 P.M. Illustrated lecture, "Palms Through a Botanist's Eye," Dr. Walter H. Hodge, Longwood Gardens.

Palm Conference Program

Friday, April 18, 1958

Cooperation of Fairchild Tropical Garden, The Palm Society, Park Departments, Agricultural Experiment Stations and Agricultural Extension Service.

9:00 A.M. Introductory remarks, Nixon Smiley, Director, Fairchild Tropical Garden.

9:15 A.M. Palm insects and their control, Dr. D. O. Wolfenbarger, Sub-Tropical Experiment Station, Homestead.

9:45 A.M. Diseases of the coconut palm, Dr. M. K. Corbett, Agricultural Experiment Station, Gainesville.

10:15 P.M. Palm introduction history, A. C. Jordahn, formerly superintendent of Fairchild Tropical Garden and Montgomery Palmetum.

10:45 A.M. A review of the fungus diseases affecting palms, Dr. L. A. McFadden, Sub-Tropical Experiment Station, Homestead.

11:15 A.M. Tour of Fairchild Garden on Rambler.

Noon Lunch.

1:15 P.M. Palm Propagation, Stanley Kiem, Superintendent, Fairchild Tropical Garden.

1:45 P.M. Palm culture, with special emphasis on fertilization, Douglas Knapp, Assistant Dade County Agricultural Agent.

2:15 P.M. Status of palm taxonomy, Dr. Harold E. Moore, Jr., Bailey Hortorium, Cornell University.

2:45 P.M. Palm seed germination, Harold F. Loomis, In charge, U. S. Plant Introduction Garden, Coconut Grove.

3:15 P.M. Break.

3:30 P.M. Panel discussion.

Walter H. Hodge, *President*

Society is Declared Tax-exempt

On October 29, 1957, a letter was received from the Office of the Commissioner of Internal Revenue, stating:

"It is the opinion of this office, based upon evidence presented, that you are exempt from Federal income tax . . . as it is shown that you are organized and operated exclusively for scientific and educational purposes.

"Contributions made to you are deductible by the donors in computing their taxable income in the manner and to the extent provided by section 170 of the 1954 Code."

The officers and directors of the Society are happy to announce this ruling to the membership, and hope that it will have a favorable effect on future contributions to the Society's treasury, while at the same time thanking the members for their splendid support up to the present time. W.H.H.

A Gift to the Society

Mr. Toshihiko Satake, President of Satake Engineering Company, Tokyo, Japan, has presented The Palm Society with a handsome album containing 600 photographs of the palms in the botanical garden at Bogor, Indonesia.

While in Indonesia installing rice-milling machinery, Mr. Masumoto, an engineer employed by Mr. Satake, spent his spare time at the famous botanical garden once known as the Buitenzorg Botanical Garden and familiar to those who have pored over the writings of David Fairchild and others. There, Mr. Masumoto, at Mr. Satake's request, took almost 2000 photographs of the remarkable palm collection. From these Mr. Satake selected 600 to make up an unusual album of photographs of palms which many of us in the Western Hemisphere have not had an opportunity to see.

Mr. Satake, one of the Society's early members, is an avid palm collector and student. Before World War II he had a

(Continued on Page 34)

EDITOR'S CORNER

With the beginning of a new volume, PRINCIPES has undergone some changes. The Editor and Editorial Board hope that members of the Society will find them pleasing. As innovations, we hope that in each issue there may be one or more columns of a more or less standard nature dealing with such subjects as activities of the Society, notes on culture, reviews and notices of publications concerned with palms, names of palms, use of palms, and a corner for the Editor wherein letters and miscellaneous thoughts may be published and contributors introduced. Contributions to these columns are invited.

The only contributor to this issue who has not been introduced previously in PRINCIPES is Eugene D. Kitzke, a member of the Editorial Board. Mr. Kitzke is a graduate of Marquette University with a degree of M.S. in botany. He has done additional graduate work at the University of Wisconsin and is now Research Biologist in the Basic Research Department of S. C. Johnson and Son, Inc., Racine, Wisconsin. For the past seven years he has conducted field investigations in Brazil, Cuba, Paraguay, Trinidad and Florida, and he is in charge of the company's program for development of an improved wax palm on experimental plantations in northeastern Brazil. Photographs accompanying his article are provided through the courtesy of S. C. Johnson and Son, Inc. The illustrations for Mexican palms were provided by Dent Smith. Belated credit is also due L. W. Bryan for photographs on page 160 and to David Barry, Jr., for those on page 181 of volume 1.

This first Editor's Corner might also be termed "confessions of an editor." Mr. R. B. Kurtz has written from New York with some pertinent criticism of the short article on *Pelagodoxa* that appeared in October, 1957. In self-defense, it must be admitted that the latter was written to fill space and did not receive the attention it warranted. Mr. Kurtz

(Continued on Page 16)

A Method for Germinating Copernicia Palm Seeds

EUGENE D. KITZKE

It is well known that palm seeds are frequently very difficult to germinate. Much waste of time and bench space occurs, especially in dealing with large numbers of smaller seeds, when hundreds of pots are required to secure a few seedlings from seeds that germinate poorly under the usual direct planting approach. Recent intensive work in propagating numerous species of the genus *Copernicia* has led to experiences which may prove to be valuable to other growers of palms.

Early in an effort to learn some basic information about water absorption characteristics in seeds of certain *Copernicia* species it was discovered that protracted periods of soaking the seeds in daily fresh changes of tap water could induce first signs of germination within five days to three weeks. The occasional occurrence of slime caused by bacteria and molds attacking the seeds during this water-soaking period was discouraged by regularly rubbing the slime away from the seed coats manually when changing to fresh water. *Copernicia* seeds can easily be removed from within the fruit and consequently all seeds discussed here were clean and free of any vestiges of pericarp. In addition to wishing to prevent rot, the development of microbes was discouraged to obviate any possibility that phytotoxic or inhibitory substances be produced by them as has been suggested in the literature. Glass, porcelain and concrete containers were used during the course of this investigation.

Any softening of a particular seed was considered as a sign of incipient rot which prompted its discard after dissection. Very few seeds were ever lost in this manner and dissection usually revealed that insect infestation by bruchid larvae or the same insects attacked by a secondary parasite, a chalcid wasp, had caused the seed injury leading to susceptibility to rot. Since the seeds had been fumigated with methyl bromide the insects were dead prior to the soaking period.

It may be worth noting here that when hundreds of small seeds are being worked with, another labor-and space-saving device is water flotation of the seeds. Experience has shown that seeds that float are usually not viable. The most common reason for the lack of viability is injury due to insect parasitism, although on occasion fungus damage has been noted also. However, when the stage of larval development is very early, some seeds will not float despite fatal insect damage. Accordingly, not all of the nonviable seeds can be separated in this manner.

An obvious pattern of lower viability was noted for seeds in an inverse relationship to their age dating from time of harvest. Although older seeds may require many weeks of soaking before germination occurs in large numbers, the freshly harvested seeds were found to germinate as early as two days after soaking began. Freshly harvested seeds which of necessity were delayed as much as four weeks by U.S. Plant Quarantine inspection and fumigation treatment or by unexpected transit delays in shipping were found to begin the first flush of germination within five days. Continued soaking produced the appearance of additional germ sprouts until after one month over 80 per cent of the seed lot usually would germinate. Incidentally the evidence is that methyl bromide fumigation does not adversely affect viability of *Copernicia* seeds.

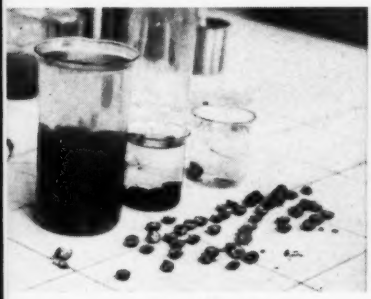

Fig. 1. Soaking *Copernicia* seeds in the laboratory in Brazil permitted detection and analysis of insect-infested "floaters."

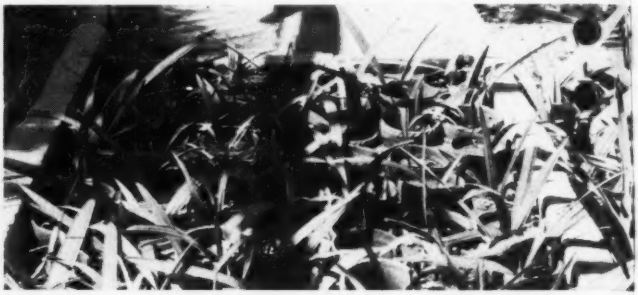

Fig. 2. Sunken pots in beds were repositories for some of the water-sprouted seeds. Nearly 100 per cent emergence occurs.

Fig. 3. Some seeds were planted directly in beds with brick-lined bottoms preventing excessive downward root-growth and simplifying transplanting.

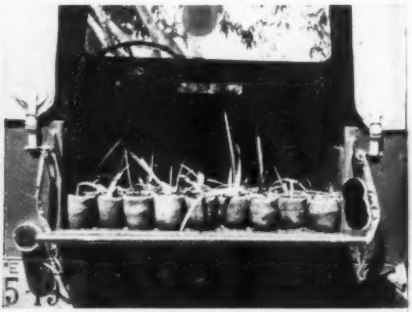

Fig. 4. Seedlings nine months old grown in nursery beds being transported to the field for transplanting.

Fig. 5. *Copernicia hospita* (right) from open nursery is too large at 3½ years for convenient handling but can be transplanted successfully. *Copernicia australis* (left) at nine months is a better size.

Fig. 6. *Copernicia Baileyana* two years old grown from seeds germinated by water-soaking technique.

The sprouted seeds were immediately planted singly in pots as fast as they germinated and first seedling leaves were observed to emerge within thirty-five days. This novel approach has great advantages over planting dry seed directly into potted soil since, unlike the dry technique, the viable seeds in this case can be distinguished from those which will not give rise to seedlings. There is consequently no loss in space, time, labor and materials, and the savings which thus accrue become available for more profitable use. It is also true in the case of *Copernicia* that higher percentage of germination is experienced using this technique.

When the factor of increasing age of seed is considered, a gradual decline is noted in per cent of viability of seeds in this genus of palms. This may also be true of other small-seeded palms. Since frequently long periods elapse between the time that the collector harvests and the grower receives the seed, it would be well for growers to consider testing this water-soaking technique as a more efficient means for germinating such palm seeds.

The specific palms involved in this study may not be considered very important by growers at present since research on them is being done in an area of restricted interest. However, it is thought that possible application of this technique might be found useful for other genera of palms. Some work has begun at the U.S. Plant Introduction Garden at Chapman Field, Coconut Grove, Florida, using other small-seeded palms known to be difficult to germinate.

Of the species studied by this laboratory one is from Brazil, one from Paraguay, one from Venezuela, and twelve are from Cuba. The Paraguayan specimen, *Copernicia australis* Becc., presented an additional problem.

With *C. australis*, it became apparent that simple water-soaking alone would not produce the desired germination since out of several thousand seeds only 1.5 per cent germinated within the first thirty days. This was an entirely unexpected result since the seeds were relatively fresh and fully mature. To determine what might break this apparent dormancy, a number of the treatments known to be successful in testing seeds of other plants were tried. They included:

1. Freezing for twenty-four hours in ice cube trays (one seed per cube) and then thawing in tap water.
2. Chilling in water for forty-eight hours at refrigerator temperatures (4°C.).
3. Soaking in hot water (five minutes at 70°C.).
4. 10 per cent sulfuric acid bath (fifteen minutes).
5. Continuous aeration in water. (seven days).
6. Scarification of seed coat near embryo.
7. Control—fresh changes of tap water.

Each set listed above was given the initial treatment described and then soaking in daily fresh changes of tap water was continued until germination occurred. The response was excellent for (6) scarification; good for (4) sulfuric acid bath and slight for (5) aeration. All other treatments showed no improvement over the control. Since the scarification proved to be the fastest method (overnight) it was selected for use when controlled early germination was required.

Soaking of several hundred untreated seeds in daily fresh changes of tap water was continued for nine months and during that time a sporadic flurrying of natural germination still occurred. All seeds after this protracted period were still viable and were finally germinated nearly 100 per cent by the scarification method. Apparently no harm from the long soaking-period occurs to the dormant seeds of this species so long as daily change to fresh water is continued to prevent microbial degradation.

The natural habitat of *Copernicia australis* Becc. is the flat plain lowland area

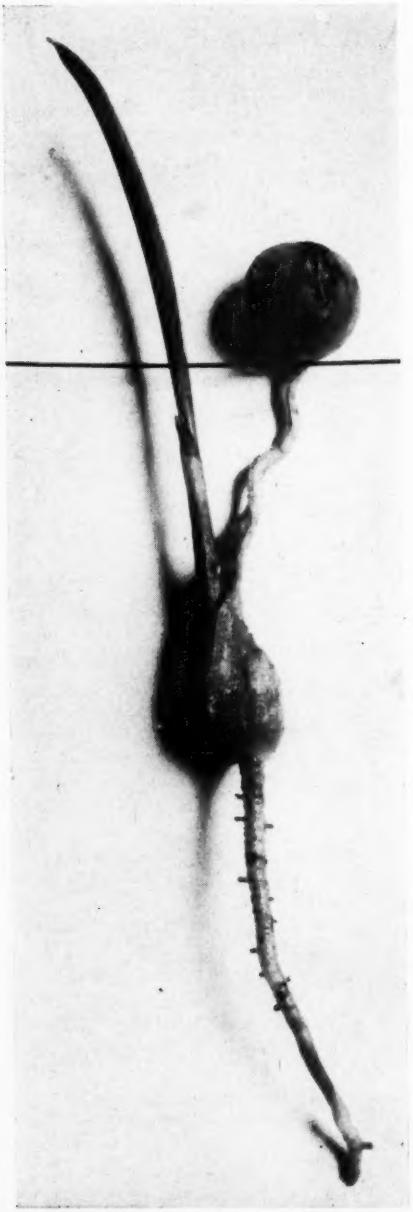

Fig. 7. *Copernicia hospita* seedling 40 days after initial germination sprout appeared grown in hydroponic system.

of the Gran Chaco in Paraguay. Annual flood stage of the Paraguay River produces standing water around the palms for weeks at a time and it seems likely that microbial degradation of the seed coat in this standing water may cause an effect similar to scarification. However this treatment variable of allowing microbial attack of the seed coat to occur was not practiced and whether this would encourage germination is not known.

By excising the flap of seed coat away from over the embryo the germination sprout could be induced to emerge within twenty-four hours in this group of long-soak seeds. That they should have remained alive under the described soaking conditions for such a long period seems unusual. Some preliminary work suggests that naturally occurring water-soluble and water-insoluble anti-microbial agents are to be found in the seed coat.

Extractives from various *Copernicia* seeds have been selected for further study to determine what their inhibitory powers might be. Despite the current lack of full understanding of the *C. australis* dormancy and water-soak phenomenon, the numerous seedlings which were grown from this lot are living tribute to the peculiar history of these seeds.

Occasional miscalculation in dissecting away the seed flap caused a tearing or cutting into the embryonic tip. This invariably resulted in the formation of a fibrous atypical root-like growth which continued atypical until the endosperm became exhausted. Such damaged specimens rarely recovered to produce normal seedlings.

From these experiences with fifteen of the thirty identified *Copernicia* species it is evident that this water-soaking method of seed germination is a most practical approach when attempting to grow large numbers of palms of that genus. It is suggested that many of the small-seeded palms may similarly benefit from this technique.

Palm Letters from Mexico*

San Luis Potosí
August 23, 1957

DEAR HAL:

We left home on the 13th, drove to Brownsville in three days, and came the remaining distance to San Luis in two more. The palms as ornaments get a more conspicuous shake at Brownsville than anywhere else along the route we took. Washingtonias of both species are more in evidence than any others. Next in numbers are species of *Phoenix*, most of which appear to be *P. dactylifera* (the fruit at Brownsville is seldom good). Next follow planted specimens of the native *Sabal texana*. Other planted kinds are few. We had dinner one evening with some of our Palm Society associates—Mrs. Sulema Etchison, who is pioneering a planted collection of palms, and Mr. and Mrs. Wheelock, owners of the Tropical Nursery. Next day we visited together the old Rabb grove of *Sabal texana* about ten miles southeast of town and said to contain about 200 acres. The wild palms in an almost solid stand look for all the world like *S. Palmetto* in the same kind of stand in Florida, but not so the planted individuals in town. The latter all have had the leaf bases removed, and the trunks at once appear much stouter than in *S. Palmetto*. Both flowers and fruits are very sparse in the trees at this time of year. The few fruits seen are still green and from the ground look like medium-sized grapes—much larger of course than the fruits of *S. Palmetto*.

The only indigenous wild palms seen between the border and San Luis were sabals, presumably *S. mexicana*. From the border, we drove 138 miles without noting a single palm of any kind, and then at Jiménez saw the first sabals—about a dozen. Farther south, they appeared sporadically but in increasing numbers and finally they made extensive groves and forests. The last tall adults persisted to about 2500 feet elevation after leaving Ciudad Victoria. As we climbed up toward the plateau, I stopped by several streams and peered into the undergrowth in the hope of seeing *Collinia* or *Chamaedorea* plants, but nary a one. Alas, I could not follow your suggestion to take the side trip up to Jaumave from Ciudad Victoria, for a new road is now under construction and the route is absolutely impassable.

Hotel Diligencias
Veracruz, Ver.
August 30, 1957

Stanley [Kiem] accompanied by a young friend [Bob See] about his age flew in to San Luis Potosí the night of the 24th and we took off on the 26th for Mexico City. [From Mexico the route led via Tehuacán to Orizaba thence to Puente Nacional and northwest to Jalapa before turning to Veracruz.]

One ornamental palm with palmate leaves much seen in Orizaba and elsewhere in the uplands [and prominent in some parks of Mexico City] has had us puzzled. Looking at two specimens through a barbed wire fence at San Luis, I thought I was seeing *Coccothrinax*. Not so, however, once I could get inside the fence. When Stanley came along, he thought the two must belong to *Brahea*, but as we saw more and more of these fan palms in other towns, I began to suspect *Trachycarpus*. Finally, when we got into the Jardín Lecuona at Banderilla (yesterday), there were a number of older specimens of the mysterious palm and there I concluded definitely that it is *Trachycarpus*. The eldest Lecuona sister calls it "Areca japonesa."

What we took to be *Chamaedorea monostachys* . . . was in fruit—plentiful and ripe. So we bought . . . about two kilos of this fruit. In the garden are two

*Extracts from letters addressed to the Editor by Dent Smith with editorial interpolations bracketed.

specimens of *Chamaedorea elatior* (. . . "chamaedor' enrededera") one of which is looped about in quite impressive fashtion and is in fruit. The latter is still too green, but [the owners] promised to save it for me and send it when ripe. We bought some other *Chamaedorea* fruits of an undetermined species and that completed the haul from the garden.

But you are wondering about the Barranca de San Miguel near Fortin and also the Barranca de Texolo . . . . we spent about four hours in the former day before yesterday and over two hours in the latter yesterday. The abundance of bromeliads, orchids, aroids, and some other plants in both makes it quite a heaven for fanciers of those plants. Certainly I can't say that the palms were abundant, but we found, or thought we found, all the *Chamaedorea* species you had indicated for each of those barrancas. Unluckily the people thereabouts don't agree as to which species is *Tepejilote* and we have with us nothing descriptive of the palms, but we think and trust, that we have correctly identified it. The coffee-banana cultivation in those barrancas, I suppose, accounts for the scarcity of palms there. We took leaves and seed of all the *Chamaedorea* species found, but not one was in flower.

Driving down yesterday to the coastal plain from the region about Jalapa, we saw plenty of acrocomias, a fair number of scheeleas and, when finally approaching the seacoast, sabals. We did not stop to collect seed or take photos because we will get a crack at these palms later. We leave here for the trip south along the coast to the Isthmus either late this afternoon or tomorrow morning.

Fig. 8. *Chamaedorea monostachys* ? growing in the Jardín Lecuona at Banderilla, Veracruz.

San Luis Potosi
September 23, 1957

In the last installment we were [located] in the Gran Hotel Diligencias in Veracruz and were contemplating the start of the trip on down the coast on the morrow. This plan, however, was set aside for one day in order that we might make a one-day side trip from Veracruz via Tierra Blanca, Ciudad Alemán, and Papaloapan to Tlacotalpan where the road comes to a definite end, and from whence the return trip to Veracruz must be made over the same road [or by launch down the river]—in all about 300 miles.

The most conspicuous native palms hereabouts [Veracruz-Tlacotalpan] are the *coyoles* — *Scheelea Liebmannii* — as they are also throughout the southern coastal plains of Veracruz. Occasional *palmares* or groves of them are seen from the highway, but mostly they now exist as numerous scattered individuals in all stages of growth. The taller trees, to 60 feet or more, are straight-trunked and have handsome crowns of pinnate leaves not unlike, from a distance, the crowns of the coconut palms. The similarity in this region is the more striking because the boles of the coconut palms, instead of being crooked or leaning, are remarkably straight. The foliage of the younger scheeleas, or at least those of moderate stature, appears to be much longer and more abundant than that of the taller and older trees. The boles seem to be self-cleaning after reaching a height of about 12 feet; and it seems certain that the palms of this genus grow much faster in the heavy moist soils of the region than they do in Florida. We saw no flowers but did see a fair number of trees in fruit, some of it already ripe

and yellow in color. We wanted to collect fruit, but the ground was flooded where stood lower trees with ripe fruit. Not being provided with rubber boots, we had to forego it.

Beside the road, however, in a buzzard-ridden hamlet north of Ciudad Alemán, was a luscious bunch of yellow fruit hanging about 25 feet above the ground, and this bunch we finally obtained through the efforts of some local citizens. First we had to hire a general superintendent of operations who, in the course of time, supplied a long thin-slatted pole and a small boy to climb it. Armed with a machete and a rope, the boy finally lowered the bunch to the ground, but not without directions and curses from the superintendent and shouted advice and encouragement from some twenty bystanders. Said superintendent and boy got 12 pesos and Doña Lupe, owner of the palm got 10. A loafer who seized the fruits and carried them 40 feet to the car claimed and got 2 pesos. The bunch weighed about 60 pounds. Besides the scheeleas a few trees of *Sabal mexicana* and of *Acrocomia mexicana* were visible from the highway. These two palms are intermittent here as elsewhere, and nowhere dominate the entire coast in the manner of the scheeleas.

Farther south, on the eastward approaches to Tlacotalpan and on the banks of the Río Papaloapan, we saw extensive groves of mango trees—some of them immense and most astonishingly symmetrical; and still farther along, occasional *Roystonea* palms evidently not planted by human agency. Northbound for Veracruz once more, we were advised in Ciudad Alemán that many chamaedoreas were to be found near the *vertidor* of the new Alemán dam on the Río Tonto. This very large project, still under construction, is reached by an unpaved road leading west from the highway at a point about one-third of the way from Ciudad Alemán to Tierra Blanca. Once at the dam, a further distance of about 15 kilometers had to be covered to reach the *vertidor* or spillway, itself no mean piece of construction. The total distance was much greater than we had anticipated, and we arrived at the *vertidor* about twilight. Stanley and Bob scrambled about the steep hillsides till it got too dark to see, but I believe found no chamaedoreas in that poor light. This was where a very slender and tall fan palm, subsequently seen by us in other localities farther south, was first spotted on this trip—in this case by Stanley. This palmate-leaved palm, in Bailey's treatment of the genus *Sabal*, seems to answer to nothing but one or the other of the two so-called botan palms, *S. Morrisiana* or *S. nematoclada*, neither of which were reported by Bailey as native in Mexico. The dead persistent inflorescences are very conspicuous because they greatly exceed the leaves, and the topmost ones were sometimes nearly erect. The region about the *vertidor* is very wild and rugged. I doubt that it has ever been explored for lack of access roads hitherto; but it was dark, and we had to get back

Fig. 9. *Scheelea Liebmannii* about five miles east of Papaloapan on road to Tlacotalpan.

Fig. 10. *Schee'ea Liebmannii* 30 miles west of Cárdenas, Tabasco, which, to judge by Bob See's figure at base, must be nearly 100 feet tall.

to Veracruz which we reached about 10 p.m.

[Here followed some remarks deploring the limited time, inadequate vehicle for negotiating the unpaved high-centered roads, rains that made some localities inaccessible.]

Next day, September 2nd, we started south from Veracruz with San Andrés Tuxtla as the goal for that night. A short distance south of the city we began to see scattered trees of *Acrocomia mexicana,* a palm that we had seen before at elevations as high as 2500 feet. This palm pops up sporadically in the most unexpected places. Perhaps it is the most widely distributed of any Mexican palm, unless exceeded by *Sabal mexicana;* but its distribution is singularly scattered and erratic. Here the palms were growing within a few hundred feet of the open Gulf of Mexico and here we stopped to collect some fruits not yet quite ripe. South of Alvarado, the scheeleas, acrocomias and sabals were fairly abundant on both sides of the road and we saw occasional roystoneas that may or may not be native. We also saw *Astrocaryum* and *Desmoncus* from the moving car. We passed through a torrential rain in this area. One entire village was flooded about a foot deep, water entering all the houses and *jacales.* In a ravine north of Santiago Tuxtla there were a few *Bactris* palms from which Stanley got seed and two *Chamaedorea* species which we had previously seen. Nowhere, incidentally, did we see plants of *Chamaedorea* actually in flower, even though a number had their green spadices and some had green or mature fruit. We could do nothing more in these beautiful hills near the Tuxtlas because of the late hour. Too bad, because you had indicated we might find *Reinhardtia gracilis* var. *gracilior.*

On September 3rd, we left San Andrés Tuxtla with Coatzacoalcos next overnight objective. About 19 miles south of San Andrés, on hillsides above the road, we saw many plants of *Astrocaryum (Hexopetion), Chamaedorea*

elatior, *C. Tepejilote*, and *C. oblongata* (?)—more *Astrocaryum mexicanum* than any others and these to about 15 feet overall. Approaching Coatzacoalcos we saw the roystoneas you had mentioned in the swampy lowlands and all the way to the river. Heading for the river, one sees beside *Roystonea*, clumps of *Paurotis*, much *Desmoncus*, some *Bactris* too and even *Scheelea*.

We crossed the Coatzacoalcos River and headed for Tabasco on the 4th. On the south side are various new dirt roads near the oilfields, no signs of course anywhere. This fouled us up pretty badly for a while, though finally a Mexican steered us through La Venta field and in time we emerged on the main road to Villahermosa. This road is brand-new and still under construction. When finished, it will be a fine artery all the way to Villahermosa and is called *Paralela 18* because it approximately follows 18° North Latitude. It has been "open" for adventurous travelers for about a year, but actually has been negotiated chiefly if not entirely by trucks and busses. For this reason—its newness—the roadside forest has not yet been cut down as pretty much everywhere else in Mexico. We went as far as Cárdenas, where we spent the night, and did not continue all the way to Villahermosa because of two more intervening ferries with steep muddy approaches that sounded too ominous. This part of Tabasco has not yet been [much] explored for plants because, up till now, it has been virtually inaccessible; thus we were, in all likelihood, the first residents of the United States to have seen the native *Roystonea* growing nine miles west of Cárdenas, or even to know of its existence. In fact, Stanley spotted a double-headed *Roystonea* by moonlight and next day won from me $1 Mexican when he proved in daylight that he had not seen a mirage.

From the roadside in this same *Roystonea* area may be seen *Scheelea*, *Paurotis*, *Sabal mexicana*, *Bactris*, *Desmoncus*, and also the botan fan palms if that's what they are. Some 23 miles west of Cárdenas, we met *Astrocaryum* and thickets of *Bactris* all along the road. At 52.1 miles west of Cárdenas, in a ravine below a big-bridged culvert, we found shade palms more numerous than anywhere else; many slender tall-growing palms with pinnate leaves trisectionally divided which we naturally took to be a *Geonoma*. Most of these were young plants or not fully grown and without fruit, but one tall individual

Fig. 11. *Scheelea Liebmannii* and the slender *Sabal* near the boundary of Veracruz and Oaxaca on the trans-isthmus highway.

Fig. 12. *Geonoma* 30 feet high in ravine 52.1 miles west of Cárdenas, Tabasco.

had ripe fruit 20 feet above the ground, and to get this fruit Stanley had to cut down the palm with his dull machete. He paced off the palm at 30 feet overall! At this same spot were many *Chamaedorea* palms with oblong pinnae and orange fruit [probably *Eleutheropetalum Sartori*], much *Bactris* and *Desmoncus*, long-petioled *Sabal* dwarfed by deep shade, and all associated here with beautiful large tree ferns, heliconias with orange and red flower scapes, monsteras, philodendrons, numerous fern species, under big hardwood trees. Strangely, the usual overburden of bromeliads and orchids was missing.

Next on the docket was crossing the Isthmus of Tehuantepec from Coatzacoalcos to Salina Cruz. The trans-isthmus road is mostly unpaved and in bad condition. On the way we turned up but one palm not seen by us before, viz., *Chamaedorea geonomiformis* or what we believed to be that species [but probably *Eleutheropetalum Ernesti-Augustii* which appears along parts of this highway] quite numerous in a ravine together with other *Chamaedorea* species seen before, *Desmoncus*, *Bactris*, shade-dwarfed *Sabal*, plus the usual tree ferns and other luxuriant plants. Nowadays one sees few palms from a moving car on the isthmus road, the adjoining land having been all cut over. We stayed in Tehuantepec and next day drove to Tuxtla Gutiérrez. No good forest remains along the roadsides anywhere except in an occasional steep barranca too rough for planting, and even here a certain amount of lumbering has been done. Professor Hernandex X. had told us that the richest palm region in Mexico lies here in Chiapas some two days on foot beyond Niltepec [Oaxaca]; but alas, we had neither the time nor the equipment to make it in there—two days in and two days out. Very much the same thing applied to all of Chiapas that came within our ken: the forests and the palms are doubtless there, but way back, at no convenient distance from the road and our base, the car itself. At

Fig. 13. The slender botan (*Sabal*) on the trans-isthmus highway.

Tuxtla we went to see Dr. Miranda's botanic garden which contains as yet few palms indeed; and then we took the long, steep, rocky road up to the crest of the Sumidero. Stanley and Bob scrambled about the clifflike hillsides for a couple of hours, but the only palm loot consisted of small *Chamaedorea* plants—a half dozen maybe—which were, in all probability, *C. glaucifolia*. We drove on to San Cristobal de las Casas. Palm yield zero, but this part had now become simply a tourist trip. Next day, back in Tuxtla Gutiérrez, time was about up for Stanley and Bob, so from here they flew out on the return journey to Florida.

[Dent then returned to San Luis Potosí in more of a hurry than he had expected due to unexpected dental difficulties and thence back to Florida himself.]

One palm remains to be mentioned. On the way to Mexico City, 55 to 60 miles north of Oaxaca, scrubby clumps of a fan palm, presumably *Brahea* [*Brahea dulcis*], without emergent trunks were evident on dry forbidding hillsides. After 5 miles of patches, they disappeared and did not reappear till after mile 121 north of Oaxaca. Here they are distributed along the road on both

Fig. 14. *Brahea dulcis* on dry limestone hills west of the Pan American highway 121 miles north of Oaxaca.

sides for about 15 miles, perhaps a different species [still *Brahea dulcis*]. These last have many emergent trunks, the latter sometimes creeping or much curved at the base, then erect to 12 or even 20 feet. I counted as many as 14 young stems in a clump. The foliage is stiff, bluish green; the petioles are armed; the trunks ringed where not burned. No flowers or fruits were seen. The elevation is about 2100 feet and the bare rock supports typically xerophytic growth of opuntias, yuccas, and the like. In some gullies and barrancas, the palms and yuccas of about the same height seem almost to alternate; younger clumps resemble *Serenoa* in habit.

These braheas were the only wild palms seen in the more than 600 miles of road between Oaxaca and San Luis Potosí. This testifies to the aridity of this huge area. I had hoped to visit the lowlands on the west coast, especially in Guerrero and Nayarit—but toothlessly, nothing doing. Thus endeth the palm account. DENT SMITH

EDITOR'S CORNER (Cont.)

writes " . . . However, considering the remarkable character of this palm, I do not believe the article quite did justice to it. The main criticism is that there should have been a reproduction of the cross-section of the fruit and of the grapelike cluster of fruit given as a line drawing in *Revue Horticole* (1917). Also the remarkable appearance of this palm when the paddle leaves are not frayed into segments should have been shown . . . You overlooked or did not mention . . . references which would have been of interest to readers, viz.: *Revue Horticole* 96: 139, 1924; Brown, F. B. H., *Flora of Southeastern Polynesia* 1: 119, 1931 . . . Mr. James E. Smith of Oakland Park, Fla., had several seeds . . . in cans when I was there last summer."

The reference to Brown's work, which appeared as *Bernice P. Bishop Museum Bulletin* 84, touched a sore point. I had consulted this fine account in the past, yet completely neglected it when writing in haste. The reference to a further article in *Revue Horticole*, illustrated with a handsome habit photograph, was new to me but has since been added to my reference cards.

Worst of all, the photograph purporting to be *Pelagodoxa Henryana* in Tahiti is probably not that species at all but *Verschaffeltia splendida*. My own color transparencies were not suitable for black and white reproduction so the photograph taken by Capt. Johnston was used. Quite by accident, I recently came across a photograph of *Verschaffeltia* taken in the Royal Botanic Gardens, Port-of-Spain, Trinidad, by Dr. Bailey in 1922 and another published in David Fairchild's *Garden Islands of the Great East* (p. 160A). These are so similar to the "*Pelagodoxa Henryana*" published in PRINCIPES that little doubt remains. Thus the mention of prop roots for *Pelagodoxa* in the description should be deleted.

Pelagodoxa deserves further careful study which has not been possible in the intervening weeks. It will be the subject of another note when it is possible to print authenticated photographs.

The Executive Secretary has also forwarded a letter from our youngest member, Mr. Arthur Scarpa, 15, of East Boston, Mass., which contains this encouraging report:

"My collection of palms has been growing steadily since I joined The Palm Society (October 21, 1957). I have seven *Chamaedorea elegans*, one *Cocos nucifera*, one *Phoenix pusilla*, twenty-five *Phoenix canariensis*, one *Sabal Palmetto*, one *Roystonea regia*, one *Chrysalidocarpus lutescens*."

The Royal Palm Climbers of Cuba

WALTER H. HODGE

In Cuba, an island famed for its palms, no species is more familiar, widespread, or beautiful than the native royal palm or *palma real (Roystonea regia)*. Besides gracing the lush green Cuban landscape, this tall handsome species also serves the country folk as a source of a number of utilitarian products.

Among the best known of these are the smallish fruits (11-13 mm. in diameter) which the Cubans call *palmiche*. These are borne in tremendous numbers in branching clusters attached at the summit of the smooth trunks at the point where the trunk joins the green crownshaft. *Palmiche*, with its high oil content, is the principal food used for feeding and fattening Cuban hogs as well as other stock. Thus it is a sort of tropical mast. As with most fruits, *palmiche* falls when it is dead ripe. For this reason it is generally gathered before fully mature so that the fruit may be more easily carried on its stalks from the fields or hills where the palms grow to where it will be used as stock food.

To harvest ripening *palmiche* from the lofty summits of palms which may reach up to 100 feet tall would seem a hopeless task to most of us. Actually, among Cuban country folk, there has been developed a special trade or craft, that of the so-called *trepadores* or royal palm climbers whose sole job it is to climb and harvest *palmiche*. Trained from youth, these men have developed a special technique of climbing the smooth boles of royal palms. Just how they do it has been well described by Thomas Barbour in his volume *A Naturalist in Cuba*, from which the following paragraphs have been excerpted with permission of Little, Brown and Company, Boston, publishers, and Atlantic Monthly Press. The accompanying photographs used here for illustrations are of a *trepador* in action near Cienfuegos at the Atkins Garden of Harvard University at Soledad, the same spot described by Barbour.

"A trade highly characteristic of Cuba, which has considerable prestige among country folk, is that of the royal palm climbers or *trepadores*. Our neighbor in this profession at Soledad is a short, thickset, rather silent little man who is always accompanied by his son as assistant. When we send for him, he comes with two long loops of strong rope draped over his shoulders. To each of these is attached a sort of stirrup, well padded to make it comfortable. The padding usually consists of strips cut from old sugar sacks. He puts each loop around the tree, and passes the stirrup through the bight of the loop. One stirrup is considerably longer than the other. Into one he pushes his leg as far as his knee, the other he catches on the ball of his foot. By seesawing back and forth he shifts his weight from one stirrup to the other. This makes it possible for him to push each loop alternately up the tree with his hands, a foot or more at a time. Thus he hitches his way up the tree in less than no time. When he gets to the top, to that smooth green region below the fronds, he stops and hangs an arm over one of these to steady himself. His trusty machete is hanging from his belt.

"Each cluster of *palmiche* is enormous, weighing perhaps fifty to sixty pounds. If one of these were chopped off and dropped directly to the ground, hundreds of the little berrylike fruits would be lost. Therefore he now removes from his belt a long coil of rope which has been worn smooth from long use. He makes this fast to the top of the tree and tosses the other end to his son, who carries it off and makes it fast at some little distance away to the trunk of a neighboring palm, being careful that the rope is stretched taut. Now when father chops the cluster of *palmiche* loose, it straddles the line which has been pulled as tight as possible: so it slides to the ground and is caught and slowed up before it hits the earth.

"The fruits are like small nuts, and when ground up make a most excellent hog feed so that each adult royal palm is

(Continued on Page 20)

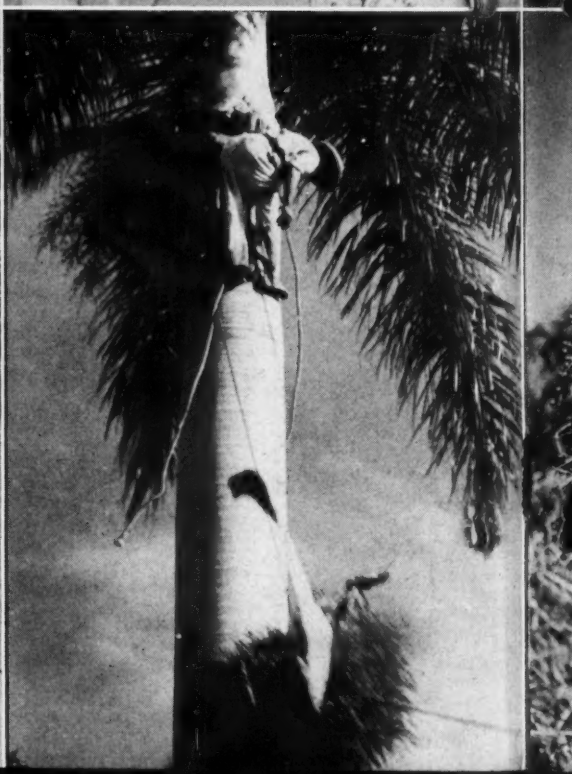

Fig. 15, top left:

". . . he comes with two long loops of strong rope . . . he puts each loop around the tree . . ."

Fig. 16, top center:

"To each of these is attached a sort of stirrup, well padded to make it comfortable . . . Into one [stirrup] he pushes his leg as far as his knee, the other he catches on the ball of his foot."

Fig. 17, top right:

"By seesawing back and forth he shifts his weight from one stirrup to the other [making] it possible . . . to push each loop alternately up the tree . . . Thus he hitches his way up the tree . . ."

Fig. 18, bottom left:

"When he gets to the top . . . he . . . removes from his belt . . . a rope which . . . he makes . . . fast to the top of the tree . . ."

Fig. 19, bottom center:

"When [he] chops the cluster of *palmiche* loose, it straddles the [taut] line . . . so it slides to the ground and is caught and slowed up before it hits the earth . . ."

Fig. 20, bottom right:

"Each cluster of *palmiche* is enormous, weighing perhaps fifty to sixty pounds . . ."

Photographs by W. H. Hodge

PALM CLIMBERS (Cont.)

estimated to be worth a dollar a year in *palmiche* alone. By the country people the trees are classified as one hog or two hog trees according to the amount of fruit they produce.

"Of course this method of tree climbing can only be used where the trunk of a palm is absolutely smooth. You could not climb a date palm this way. . . . The *trepadores* in Cuba travel far and wide in pursuit of their trade and, from the point of view of their countrymen, they make a very fair living."

WHAT'S IN A NAME?

The names of plants frequently prove perplexing. With the thought that some readers may enjoy knowing more about the meaning and the pronunciation of palm names, this column is begun to consider names. There is no standard guide to the pronunciation of plant names, and where English is spoken pronunciation sometimes varies from region to region. The suggested pronunciations, therefore, are by no means the only pronunciations, but they are based on the usual usage. An informal phonetic system will be used here and in later columns in which the vowels have fixed sounds: "a" either alone or at the end of a syllable as in the initial letter of *around*; "*e*" as in *pet*; "*i*" as in *if*; "o" as in *note*; "u" as in up. Except when it follows "n," the letter "g" should be pronounced as in *girl*: the dipthong "th" should be pronounced as in *thin*. Stressed syllables are indicated by an accent. Words from other languages do not always lend themselves to easy and pleasant pronunciation in English. Then, as in *Orbignya*, the anglicized form may differ greatly from the correct pronunciation in the language of origin.

Certain names for genera of plants have become so firmly fixed in botanical usage that they have been conserved by international botanical congresses over less familiar names that would otherwise replace them. There are eight of these names in the palms, or nine if *Desmoncus*, which does not actually require conservation, is included. These nine are the first names we consider.

Arenga (a réng ga) comes from the Malayan name *areng* used for *Arenga pinnata*.

Chamaedorea (cam ee dó ree a) is derived from a combination of the Greek words *chamai* (on the ground) and *dorea* (gift) perhaps from the generally low habit of the species, perhaps because the fruits are easily reached. Willdenow, who gave us the name, did not specify its meaning.

Desmoncus (dez món cuss) is a combination of two Greek words—*desmos* (band) and *ogkos* (hook)—and refers to the upper pinnae of the leaves which are modified into hooks in this genus of climbers.

Maximiliana (max i mil ee ay na) was named by Martius for the sponsor of his travels in Brazil, Maximilian Joseph I, once King of the Bavarians.

Orbignya (or bíg nee a) honors Alcide Dessalines d'Orbigny (1802-1857), a French naturalist and explorer who travelled in South America from 1826-1833 and whose palm collections were studied by Martius. If a French pronunciation is desired, a closer approximation would be "or bi nyée a."

Pigafetta (pig a fét ta) was not explained by Martius and Blume who first used it as a subgeneric name. One source suggests that it may honor A. Pigafetta who wrote an account of his voyage around the world with Magellan.

Pritchardia (pri chár dee a) was named for William T. Pritchard, once British Consul in the Fiji Islands and author of *Polynesian Reminiscences* (1866).

Veitchia (vée chee a) honors James Veitch (1792-1863), a British nurseryman.

Washingtonia (wash ing tó nee a) commemorates George Washington.

The Cultivated Veitchias

HAROLD E. MOORE, JR.

When I first visited Mr. and Mrs. A. C. Langlois at their home in Nassau, Bahama Islands, I was intrigued by the variety of palms grown at The Retreat and, at the same time, was dismayed by some of the problems they presented to the taxonomist. Among these problems, Mrs. Langlois mentioned that the handsome tree they grew as *Veitchia Joannis* was not the same as the trees grown under the same name in the Montgomery collection at Coconut Grove, Florida.

The year was 1951. Time did not permit me to study the Florida trees then but in succeeding years I made a special effort to obtain notes, photographs, and specimens so that comparisons could be made. In this I was much aided by Mr. B. E. Parham and later by his son, Mr. J. W. Parham, of the Department of Agriculture in Suva, Fiji, who procured splendid series of *Veitchia Joannis* in flower and fruit from its native country. Though a number of problems (such as the identity of the "Areca 208") remain, the problem of the veitchias has been resolved. The results appeared in technical form as a study of all 18 species of the genus in *Gentes Herbarum* 8:480-536, 1957. Five of the species are cultivated. Since it is with these five that members of the Palm Society will be most concerned, they are the principal subjects of this article.

Veitchias were unknown to botanical science until the year 1868 when Hermann Wendland described the genus *Veitchia* in Seeman's *Flora Vitiensis*. Wendland included three species from the Fiji Islands and one, *V. spiralis*, from the island of Aneityum in the New Hebrides. Of these, two (*V. spiralis* and *V. subglobosa)* remain incompletely known even today, one *(V. Storckii)* has been transferred to another genus as *Neoveitchia Storckii*, the fourth, *Veitchia Joannis*, remains as the species typifying the genus.

Today we know ten species from the Fiji Islands *(V. filifera, V. Joannis, V. pedionoma, V. petiolata, V. Pickeringii, V. sessilifolia, V. simulans, V. Smithii, V. subglobosa, V. vitiensis)*, three from the New Hebrides *(V. Macdanielsii, V. spiralis, V. Winin)*, two from sources not surely known *(V. Hookeriana, V. Montgomeryana)*, one from New Caledonia *(V. arecina)*, and one from the Philippine Islands *(V. Merrillii)*.

The last is far better known to most palm fanciers as *Adonidia Merrillii* or by one of several common names. By one of those unfortunate but none too rare instances in the palms, *Adonidia* had a separate history from 1919 (when the genus was founded by Beccari) until 1957. To explain why it now becomes a *Veitchia* will require several paragraphs of digression.

Despite the long record of *Veitchia Joannis* in cultivation—certainly since before 1883—the species lacked a complete formal description until 1957. The earliest description—that of Wendland—was based on fruits and seedlings but staminate or male flowers, so essential for an understanding of arecan palms, were not then known for the particular species. Wendland assumed, erroneously as we now know, that because the fruit was so similar to that of *Veitchia Storckii*, the staminate flowers were also similar. Later horticultural notices (in *The Gardeners' Chronicle*, series 2, 20: 205, 1883; *Revue Horticole* 55: 344, 1883; and several horticultural dictionaries and encyclopedias) illustrated young plants grown in Europe without follow-up notes on mature specimens.

Odoardo Beccari was the first to recognize that species of two distinct genera had been included in *Veitchia* by

Fig. 21. *Veitchia Merrillii* growing in the open at the Fairchild Tropical Garden, showing the distinctive crown, narrow internodes, and hanging reins. Photograph from Kodachrome by G. H. M. Lawrence. Reprinted from *Gentes Herbarum* 8: 502, fig. 144. 1957.

Wendland. With staminate flowers of *Veitchia Joannis* apparently at his disposal (there are some in his herbarium at Florence, Italy) and with specimens representing other related species from New Caledonia and the New Hebrides, Beccari recognized that *Veitchia Storckii* differed from the three other veitchias. For it, he proposed the name *Neoveitchia* in a study published after his death

(*Webbia* 5: 76-79, 1921). In this article, three new species of *Veitchia* were added to the three remaining and staminate flowers were described for two. Since he was primarily concerned with palms of New Caledonia at the time, he did not add to our knowledge of *V. Joannis*. A study of arecan palms in manuscript remained unpublished until 1955 when Professor R. E. G. Pichi-Sermolli edited the generic descriptions in *Webbia* 11. There, for the first time, *Veitchia* was clearly defined in its emended sense.

Before the above generic study was published, I had concluded from a study of Fijian material, that *Veitchia* and a later genus *Vitiphoenix*, also from Fiji, were probably not distinct. To test my conclusions, I made a comparative study of related genera and was surprised and chagrined to find that *Adonidia*, which had always seemed so distinctive, appeared to differ from *Veitchia* (considering all the species) only in the ruminate endosperm of the seed.

Thus forewarned, I made careful comparisons of all parts of *Adonidia* with similar parts of species of *Veitchia* both from dried herbarium specimens and from living plants in Florida in a search for some other distinctive feature. Even the characteristic condensed trunk and crown of *Adonidia*, usual for open-grown trees, failed. The trunk and crown of trees grown in the shade of taller trees, as in some plots of the Fairchild Tropical Garden, elongates and sterile trees cannot then be distinguished readily from sterile trees of *Veitchia Montgomeryana*. Ripe fresh fruits are similar except for a slight difference in size; flowers and the essential character of the inflorescence are the same—all but the ruminate endosperm. This characteristic alone is not now considered sufficient to separate palm genera without supporting differences in flowers and other parts. Beccari, Burret, and Moore have all united species with ruminate and homogeneous endosperm in such natural genera as *Ptychosperma*, *Euterpe*, *Synechanthus*, *Reinhardtia*, and *Drymophloeus*. *Adonidia* was therefore joined to and submerged in *Veitchia* when the final study was published. The genus as I now interpret it is described in some detail below.

The species of *Veitchia* are moderate to tall, slender-trunked trees, often somewhat thickened at the base, solitary in habit, with 6-15 regularly pinnate leaves in a spreading or ascending crown above a conspicuous deep green crownshaft. The latter is often covered with pale woolly scales intermixed near the petiole with larger deep brown shining twisted scales. Deep green pinnae are very narrow where they unite with the rachis. Their greatest width is at the middle from which they again taper to an obliquely blunt or nearly pointed tip or, in the lowermost, to long slender hanging reins which often persist for a long time. As many as 5 inflorescences appear in succession below the crownshaft, each covered at first with two pale papery bracts (or spathes) one inside the other. These bracts soon fall, leaving the branched panicle free to expand into a mass of stiffish to slender and supple branches, the lower of which are once- to thrice-branched, the middle and upper progressively less branched to unbranched. Flowers are borne at nodes placed in a loose spiral or, toward the tip of the rachilla, almost opposite. The normal complement of flowers at each node is three—a central female which develops fully only after the two flanking male flowers have expanded and fallen. Toward the tip of the rachilla or, in some species, over half or more of the rachilla, the female flowers fail to develop so that only male flowers appear in pairs or singly at each node. The male flowers are larger than the female. They have 3 low imbricated sepals and 3 rather boat-shaped petals the sides of which do not overlap (valvate). Inside are numerous stamens (24-140) surrounding a central sterile pistillode which is attenuate from a bulbous base. Stamens are united in a fleshy mass at the very base but above have slender erect filaments and erect anthers cleft at the base and pointed or two-pronged at the tip. Female flowers have both sepals and petals imbricate in two whorls of three each within which lie 3-6 small tooth-shaped staminodes and the pistil with its unilocular ovary containing a single laterally attached ovule. Stigmas are 3, recurved and short. Fruit is orange-red or red at maturity seated in a pale yellow cupule of enlarged perianth parts. The outer surface is smooth covering a thin to moderately thick pulpy layer with imbedded flat fibers. The seed is enclosed in and attached along one side of a thin to thickish endocarp. Endosperm may be homogeneous or ruminate. The embryo is always borne at the base of the seed.

Although species of *Veitchia* can be distinguished with certainty only when

mature fruit is present, there are useful characteristics in the foliage that may be used to separate mature plants in sterile condition. Pinnae of *V. Merrillii*, *V. Montgomeryana*, and *V. Winin*, have numerous tiny pale-membranous brown-centered persistent scales along the fine nerves of the lower surface as opposed to *V. Joannis* and *V. sessilifolia* in which these are lacking or at least not persistent. These tiny scales, visible to the naked eye when foliage is dried but more readily seen through a magnifying glass or low-power hand lens, have proved to be the easiest way of distinguishing between specimens that had been confused under the name *V. Joannis*. It is important, however, that they not be confused with the larger red-brown twisted scales present near the base on the lower surface of the pinnae in all species.

All the cultivated veitchias have the leaves arranged in successive whorls of five so that the crown appears to have five radii when viewed from below. The appearance of the crown is often helpful. *Veitchia Merrillii* usually has 14-15 leaves in a crown so that the radii are three-tiered. The remaining species generally have 8-10 leaves in a crown in two tiers. *Veitchia Merrillii* (when open-grown) and *V. sessilifolia* have leaves that ascend then arch rather strongly so that the tip hangs down. The pinnae are directed upward from the rachis and are uniformly spaced in *V. Merrillii*. In *V. sessilifolia*, those of the tip are directed upward but those below tend to hang and the lowermost are widely separated and distinctly pendulous, often retaining the slender green lorae or reins for a long time.

Veitchia Joannis, *V. Montgomeryana*, and *V. Winin* have the fully developed leaves of the lower whorl more nearly horizontal. *V. Joannis* is distinct from the last two (which are difficult to separate from each other when sterile) in its much more pendulous pinnae, unfortunately not illustrated here, and in their greater number—70-80 on each side of the rachis in well-grown mature trees versus 48-60 in the other two species. The number of pinnae, however, is not a safe characteristic since it varies according to the age and vigor of the individual tree.

Seedlings of all five species in comparable stages have not been available for comparison. It may be useful, however, to contrast those of *V. Joannis* and *V. Montgomeryana* since the latter has been distributed as *V. Joannis:*

Veitchia Joannis—apex of first leaves shallowly divided so the upper margins are less than twice as long as the midrib (rachis) and the broad apex is bluntly toothed: sheath greenish under a light coat of soft pale hairs intermixed with chaffy scales; the dark red-brown petiole densely chaffy with spreading scales; segments green throughout with no orange coloring on the upper side of the chaffy green rachis which is similar to the petiole in color and scales on the lower side.

Veitchia Montgomeryana—Apex of the first leaves deeply divided so that the upper margins of the segments are more than twice as long as the rachis and the narrowed apex is sharply toothed; sheath reddish with pale scales; petiole green or tinged with pink or orange and blotched with massed appressed gray scales which are seldom loose and chaffy; segments orange where attached to the orangish rachis which is blotched below; petioles of older leaves become nearly mahogany-colored but are still distinguishable by means of the blotches of gray scales; lower surface of the segments, at least of the fourth, fifth, and later leaves, densely and minutely pale scaly.

The aspects of foliage described above are not always constant even at maturity and are difficult to express in the form of a key. For the separation of flowering or fruiting plants, the following keys may be useful.

Keys to the Cultivated Species

Flowering material:

1. Female flowers borne nearly throughout the length of the rachillae, only the uppermost nodes with male flowers alone.
   2. Male flowers 13 mm. long with 130-140 stamens ..... *V. Montgomeryana.*
   2. Male flowers 9-11 mm. long with 40-50 stamens.
      3. Inflorescence with persistent minute brown scales ..... *V. sessilifolia.*
      3. Inflorescence lacking brown scales ..... *V. Winin.*

1. Female flowers borne only in the lower half or less of each rachilla, the nodes above the middle bearing only paired or solitary male flowers.
   4. Male flowers 15-17 mm. long with normally 100-110 stamens; lower branches of the inflorescence once-branched ..... *V. Joannis.*
   4. Male flowers 10-12 mm. long with 47-62 stamens; lower branches of the inflorescence twice-branched ..... *V. Merrillii*

Fruiting material:

1. Seeds with ruminate endosperm ..... *V. Merrillii.*

1. Seeds with homogeneous endosperm.
   2. Fruits large, 4-6 cm. long.
      3. Fruits borne only at the lowermost 2-3 (rarely to 6) nodes of the rachilla; seed markedly pointed ..... *V. Joannis.*
      3. Fruits borne nearly the entire length of the rachilla; seed nearly rounded at the tip ..... *V. Montgomeryana.*
   2. Fruits small, 1.4-2.2 cm. long.
      4. Inflorescence with persistent minute brown scales ..... *V. sessilifolia*
      4. Inflorescence lacking brown scales ..... *V. Winin.*

Veitchia Joannis

Veitchia Joannis was named for John Gould Veitch (1839-1870), grandson of James Veitch whom the generic name honors. We are told in *Flora Vitiensis* that Seeman introduced the species into the Botanic Garden at Sydney, Australia. John Veitch brought seeds to Europe but the seedlings do not appear to have persisted there. The first horticultural notices deal with seedlings later introduced into Belgium. Now the species is cultivated in the tropics of both hemispheres. Because *Veitchia Montgomeryana* has also been grown under the name *V. Joannis*, it is desirable to compare plants with descriptions for certain identification.

The species occurs wild on several islands of the Fiji group where it is known as *Niusawa*. The slightly astringent fruits were eaten by children and the wood was used for spars in past times. Today the leaves are used for thatch and strips of the trunk for bows and arrows.

Trees of *Veitchia Joannis* are tall and slender. The brown, prominently ringed trunks reach a height of 32 m. in the wild state and a diameter of 28 cm. above the somewhat thickened base. A green crownshaft to 12 dm. long is covered, when young, with pale or rusty woolly scales. The 8-10 leaves ascend and arch when young but at maturity are nearly horizontal with 70-80 deep green pinnae regularly arranged along the rachis at intervals of 7-30 mm. and hanging gracefully at an angle of about 45 degrees. The petiole is short, only 10-23 cm. long, but the rachis may reach a length of 3.3 m. Pinnae are largest near the middle of the leaf where they may reach a length of 93 cm., a width of 8 cm. At the base, the pinnae are much narrowed. On the lower surface they bear minute deciduous scales, only the bases of which remain as tiny dots scarcely noticeable even when magnified. The large stiffish panicles, 50-60 cm. long and

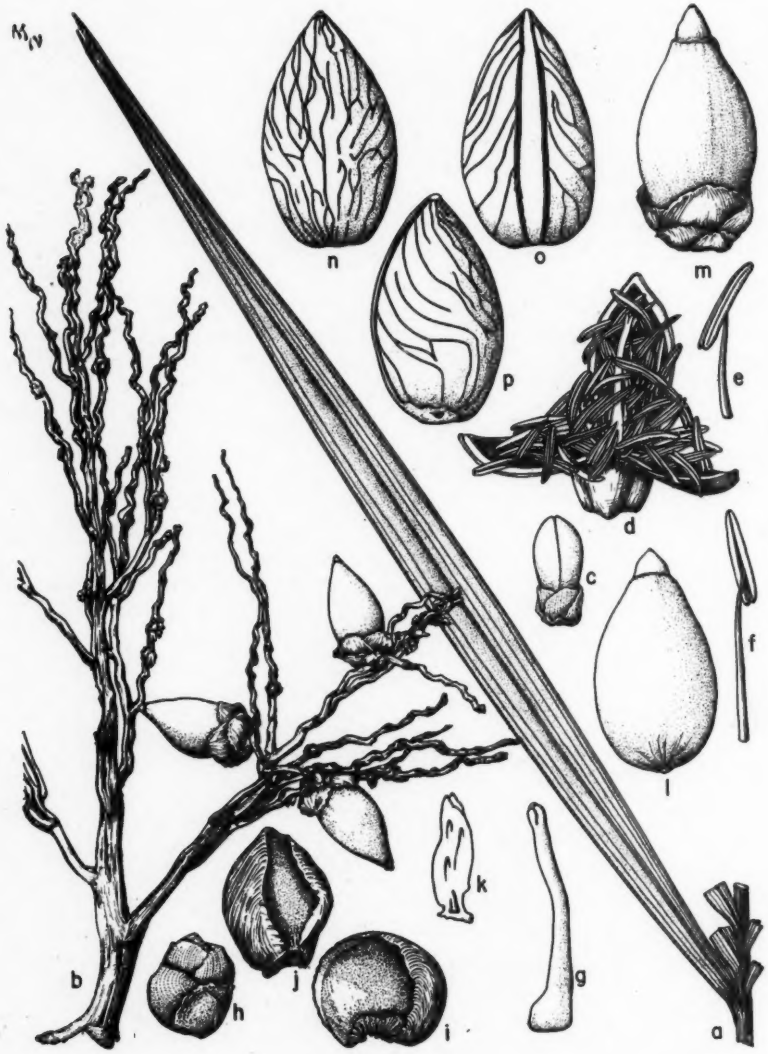

Fig. 22. *Veitchia Joannis* a, pinna × 1/5; b, panicle lacking the base × 1/3; c, male bud × 1; d, male flower expanded × 2; e, f, stamens × 3; g, pistillode × 3; h, female bud × 1; i, j, sepal and petal of female flower × 2; k, pistil in vertical section × 2; l, m, fruit × 2/3; n-p, seed in three views ×1. Reprinted from *Gentes Herbarum* 8: 510, fig. 149. 1957.

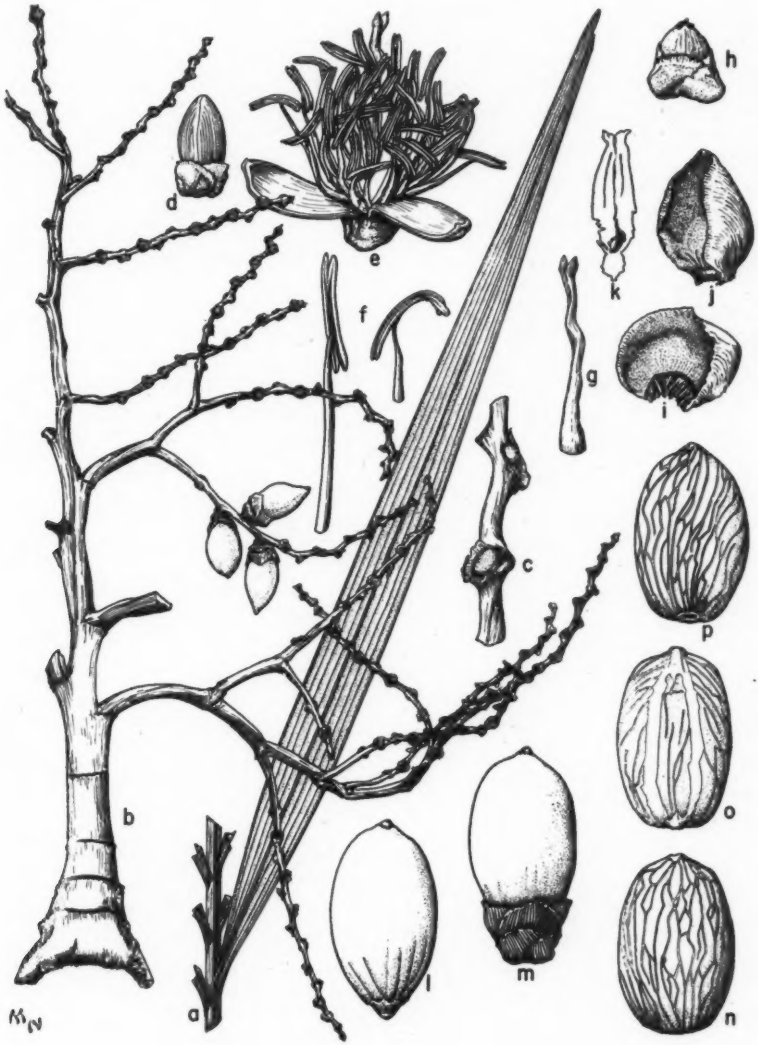

Fig. 23. *Veitchia Montgomeryana*. a, pinna × 1/5; b, panicle with few fruits and many scars where fruits have fallen × 1/4; c, portion of rachilla showing scars of central female and lateral male flowers × 1; d, male bud × 1; e, male flower expanded × 2; f, stamens fresh and dried × 3; g, pistillode × 2; h, female flower × 1; i, j, sepal and petal of female flower × 2; k, pistil in vertical section × 2; l, m, fruit × 2/3; n-p seed in three views × 1. Reprinted from *Gentes Herbarum* 8: 493, fig. 141. 1957.

about twice as broad, are covered with pale or rusty woolly scales which persist generally on protected angles. Lower branches of the panicle are again once-branched; upper branches are progressively less branched to forked or undivided. Ultimate rachillae are 10-20 cm. long, strongly flexuous, stiff and sharp-pointed (often tipped with a male flower) bearing female flowers only at the lower 2-3 (or rarely to 6) nodes, above having only paired or solitary male flowers. The latter are 15-17 mm. long with normally 100-110 stamens, though in abnormal flowers there may be as few as 83 with a number joined in a petal-like body. Anthers are pointed at the tip. The orange-red mature fruit is the largest in the genus. It measures 5-6 cm. in length, 2.2-3 cm. in diameter, and is capped with a prominent umbo about 4 mm. long. Seeds are pointed at the tip, to 3.6 cm. long, 2.1 cm. in diameter, with homogeneous endosperm.

Veitchia Merrillii

The bonga de china palm, Manila palm, Merrill's palm or Christmas palm, as it is variously known, has become a popular horticultural subject in southern Florida and in the tropics elsewhere. In fact, it was first described from plants grown in Manila, though it was later found wild on the high limestone islands of the Calamianes-Palawan group in the Philippines.

David Fairchild has written a charming account of this palm in *Fairchild Tropical Garden Occasional Papers No. 1*, 1938, where he gave details of its introduction into Florida in 1913. The name used by Dr. Fairchild was the more familiar one—*Adonidia Merrillii*—which I must abandon with much regret. Despite its second change of name (for Beccari first described it as a species of the Australian genus *Normanbya*) the palm remains as attractive as ever and has amply borne out Dr. Fairchild's prediction that it would assume a prominent place in Florida dooryards.

In cultivation, *Veitchia Merrillii* is most frequently grown in the open. Under such conditions, the trunks are rather stocky, reaching a height of 5 m. with very narrow internodes and brown bark. Shade-grown trees are taller, more slender, with prominent internodes like those of other species described here. The crownshaft is 5-10 dm. long, green with a loose cover of deciduous pale scales. A short petiole 10-15 cm. long continues into a rachis 1.75-2 m. long which ascends or spreads and arches at the tip. The leaves are 14-15 in usual crowns with 48-63 (rarely only 40) dull dark green pinnae to 75 cm. long, 5 cm. wide, borne at regular intervals of 2-4 cm. The lower surface of the pinnae has a cover of minute pale membranous scales persistent on the nerves. In the open, pinnae generally ascend from the rachis and curve over at the tip; in shade, they are more nearly horizontal. Inflorescences normally number 5 in a season. These are stiffish, 40-50 cm. long and broad, white cottony when young but soon devoid of hairs or scales except on the short peduncle. Lower branches are twice-branched, those of the middle once-branched, the upper unbranched. Female flowers are borne in the thicker lower half of rachillae 4.5-11 cm. long, the upper half being more slender and strongly flexuous with male flowers only. These are 10-12 mm. long with 47-62 stamens, the anthers either bifid or pointed at the tip. The handsome crimson fruits are 2.7-3.3 cm. long, 1.7-2 cm. in diameter, with a short cap at the tip. Seeds are somewhat pointed at the tip with a network of pale strands on the coat and ruminate endosperm.

Veitchia Montgomeryana

Veitchia Montgomeryana is something of a mystery species. It has generally been confused with *V. Joannis* in cultivation and its native home is unknown. The first records that I have seen for this species are from cultivated trees in the botanical garden at Bogor (formerly Buitenzorg), Indonesia. The species takes its name from the late Colonel Robert H. Montgomery on whose estate in Coconut Grove, Florida, I was privileged to observe trees grown from seed obtained through the botanical garden in Singapore over twenty years ago.

Seedlings from the Florida trees have been distributed as *Veitchia Joannis*. They may be distinguished from that species as previously noted in comments on foliage preceding the keys. The species seems to thrive in southern Florida. On the Keys, it resists salt spray better than some other palms of its relationship. Old or poorly grown trees may have smaller inflorescences and fruit than is normal under optimum conditions.

Fig. 24. Native assistant holding a leaf of *Veitchia pedionoma* which is very similar to the general habit of *V. sessilifolia*. Photograph by A. C. Smith. Reprinted from *Gentes Herbarum* 8; 525, fig. 152. 1957.

Veitchia Montgomeryana becomes a tree 12 m. high or more, 20 cm. in diameter, with a trunk at first gray-scaly then brown. Bright green sheaths covered at first with pale scales intermixed with darker persistent scales compose the crownshaft which is 1-1.25 m. long. The leaves, usually 8-10 in a crown, have petioles about 25 cm. long tinged with orange above, gray below when young. The rachis, which is 2.3-2.6 m. long in adult trees, has 50-60 dull dark green pinnae regularly arranged at intervals of 2-4.5 or, near the base, 7.5-10 cm. on each side. These are densely covered with minute pale scales along the nerves of the lower surface and are held nearly horizontal or only slightly pendulous. The longest pinnae are 80 cm. long, 5.5-7 cm. wide, narrowed to a slender oblique tip and slender

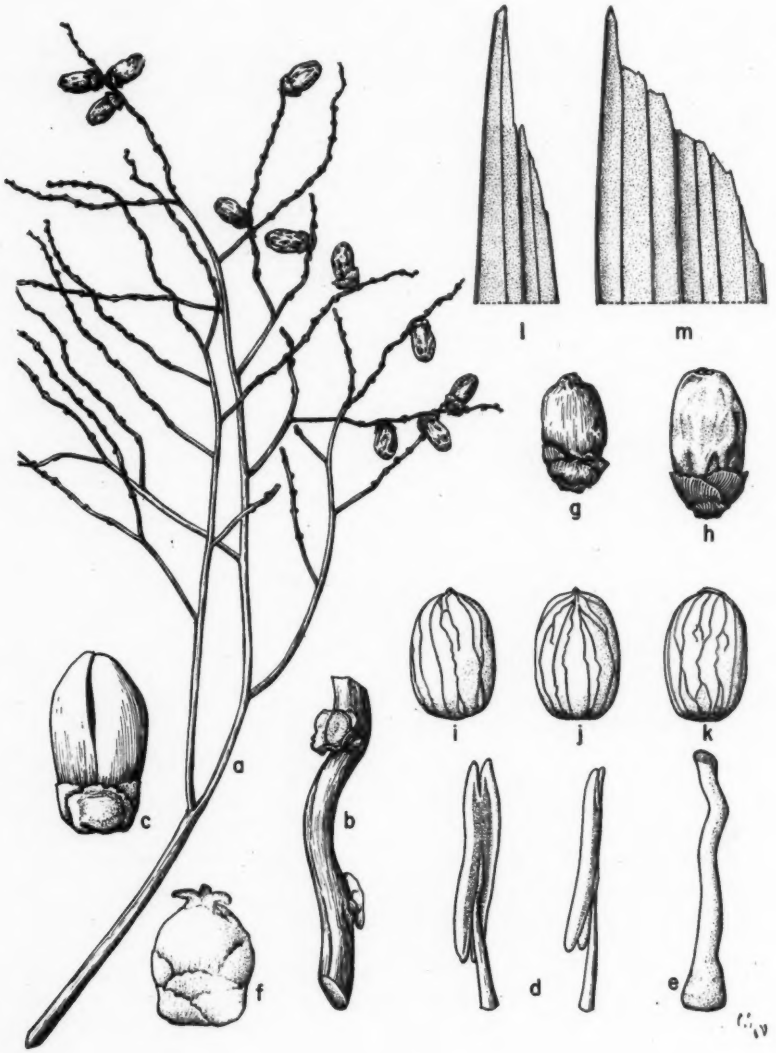

Fig. 25. *Veitchia sessilifolia*. a, portion of panicle in fruit × 1/3; b, portion of rachilla showing scars of flowers and fruit × 3; c, male flower × 3; d, stamens × 6; e, pistillode × 6; f, female flower × 3; g, h, fruits × 1; i-k, seed in three views × 2; l, m, tips of pinnae × 1. Reprinted from *Gentes Herbarum* 8: 522, fig. 151. 1957.

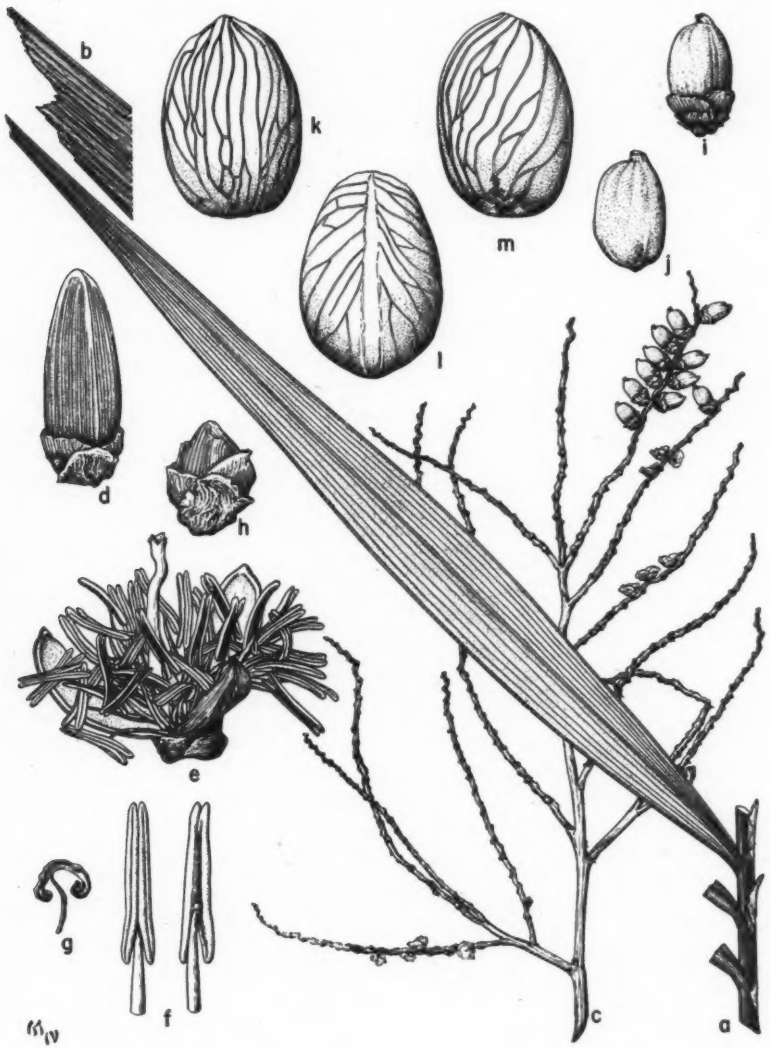

Fig. 26. *Veitchia Winin.* a, pinna × 1/5; b, tip of pinna × 1; c, branch of panicle × 1/3; d, e, male flowers in bud and open × 3; f, g, anthers fresh and dried × 5; h, female bud × 3; i, j, fruit × 1; k-m, seed in three views × 3. Reprinted from *Gentes Herbarum* 8: 500, fig. 143. 1957.

Fig. 27. *Veitchia Winin* (center) flowering at the Fairchild Tropical Garden. Photograph by Nixon Smiley. Reprinted from *Gentes Herbarum* 8: 480, fig. 139, 1957.

base. The inflorescence is broader than long, about 60 cm. long, 80 cm. wide, with the lower branches again once- or twice-branched, the remainder undivided. Female flowers appear at nodes nearly throughout the rather stiff smooth rachillae which are 13-25 cm. long. Male flowers about 13 mm. long have 130-140 stamens, the anthers bifid at the tip. The oblong-obovate red fruit is 3.9 to generally 4.5-4.6 cm. long, 2.4 cm. or rarely as little as 1.8 cm. in diameter, with a very short cap at the tip. Seeds 2.4-2.8 cm. long are rounded with a very short point at the tip. The endosperm is homogeneous.

Veitchia Sessilifolia

I am familiar only with a single sterile tree of *Veitchia sessilifolia* (formerly *Vitiphoenix sessilifolia*) in the Montgomery collection. Another tree from the same lot of seed sent from the island of Vanua Levu, Fiji, by Dr. A. C. Smith has borne fruit at the Atkins Garden in Soledad, Cuba. The species, like some others related to it, is more compact and less graceful than others due to the stiffish leaves. The Fijians use the name *Niuniu* for these species. Because of its smaller habit, it may prove a good tree for small gardens when seeds or seedlings become available in the United States.

Veitchia sessilifolia is a relatively small species with trunks reported as 10 m. high, 11 cm. in diameter except where swollen at the base. The 6-7 leaves are more than 3 m. long, erect or ascending above a dark green white-woolly crownshaft 50 cm. long. They curve conspicuously at the tip. The petiole is often short, about 10 cm. long, but may be longer. Thick, somewhat leathery deep green pinnae are irregularly distributed along the rachis 46-47 on each side. Those near the base are separated at intervals of 10-23 cm. and they hang loosely for about a meter, trailing long slender reins or lorae at their tips. Pinnae near the middle of the leaf reach 82 cm. in length, 5.5 cm. in width. They are more closely placed and are directed forward and downward. Those at the tip are shorter, closely placed, and usually stand up from the rachis. Tips of the pinnae are often nearly acute on some trees, more strongly oblique on others. All of the pinnae lack scales other than the few large brown ones near the base on the lower surface. Very much branched inflorescences are covered with small persistent red-brown scales even in fruit. The lowest branches may be 1 m. long with 5-6 major branches, these again 2-3 times branched; upper branches are less branched to undivided. Rachillae 5-16 cm. long bear female flowers at most of the 5-17 nodes. Male flowers measure 9 mm. in length and have 40-48 stamens, the anthers of which are bifid at the tip. Red fruit 18-22 mm. long, 8-11 mm. in diameter, is rather blunt at the tip. The ovoid, very shortly pointed seeds 10 mm. long have homogeneous endosperm.

Veitchia Winin

When Professor L. H. MacDaniels, now retired from Cornell University, visited the New Hebrides Islands in 1949, he collected specimens and seeds of two undescribed species of *Veitchia*. One, *V. Macdanielsii*, does not appear to have survived in cultivation but the other, *V. Winin*, has borne fruit at the Fairchild Tropical Garden. The sterile trees much resemble those of *V. Montgomeryana* but the small fruits with their eccentric cap are quite distinct. Local inhabitants of Malekolo Island, where the species grows in forests at low elevations (10-50 meters), call it *Winin*, hence also its scientific epithet.

Trunks of *Veitchia Winin* are brown and somewhat thickened at the base but above are nearly uniform in diameter (to 17 cm. or more). Trees in the wild state attain a height of more than 20 m. The crownshaft, to 9.7 dm. long, and newest rings of the trunk are deep green with a dense coat of pale woolly scales interspersed with patches of dark red-brown conspicuously twisted scales at the tips of the sheaths composing the crownshaft. Each crown has 8-10 leaves which may be 3 m. long with a densely scaly petiole 2.3-2.8 dm. long. The pinnae, 46-48 on each side, are regularly arranged at intervals of 2-5 cm. or those near the base to 9 cm. apart. They are deep green above, clothed with tiny persistent pale membranous brown-centered scales on the nerves below as well as with larger brown scales. Central pinnae are largest, 65-75 cm. long, 7.5-11 cm. wide at the middle, tapered to a narrow base and an oblique tip 4.5 cm. wide. About 5 inflorescences are produced each season. These are glabrous except for the densely pale scaly peduncle. They measure to 8.5 dm. long and somewhat wider. Lower branches are again 2 to 3 times branched and the smooth ultimate rachillae are 8-20 cm. long with female flowers and fruits borne nearly to the tip. The male flowers are 10-11 mm. long with about 50 stamens, the anthers bifid at the tip. Mature fruits are small, red, and profuse, 14-19 mm. long, 9-10 mm. in diameter, and tipped with an eccentric cap. The small seeds are about 10 mm. long and rounded at the tip with homogeneous endosperm.

A GIFT (Cont.)

large glasshouse containing a great number of palms. Due to fuel shortage during the war many of these specimens perished. However, in the past ten years he has again built up his collection. He also has a private palm museum and seed collection.

Several weeks ago Mr. Satake was kind enough to obtain and send to the Society several small plants of *Rhapis excelsa* 'Variegata,' *Trachycarpus Takil* and other rare palms. This shipment was confiscated by the Plant Inspection Bureau in Hawaii, although an import tag was enclosed and a special permit had been obtained. We hope that eventually another shipment will be allowed to reach its destination.

The Palm Society wishes to extend, on behalf of its members, its most sincere thanks to Mr. Satake for his generosity and interest. The album will be available for study at the office of the Executive Secretary. L H. W.

NOTES ON CULTURE

Mr. Douglas M. Knapp, Assistant County Agricultural Agent, Dade County, Florida, has a word of warning for those Palm Society members who are using the new chemical, Dalapon, to kill grass around shrubbery and trees. As far as palms are concerned, some species seem to be immune to this chemical. Others, latanias in particular, are sensitive to Dalapon, he says. Mr. Knapp suggests that it be used with caution around most small palms, and not at all where latanias are planted.

In Nigeria, magnesium sulphate has been found to restore health and yield in oil palms *(Elaeis)* suffering from orange frond disease, a deficiency disease. Bull and Chapas, in *Journal of Waifor* 2: 85-91, 1956, report that 5 to 7½ lbs. per plant on fine porous sand of low fertility increased yield significantly. Health was affected at the 0.1 per cent level.

PALM LITERATURE

Journal of the West African Institute for Oil Palm Research is published by the Institute which is located near Benin City, Nigeria. The journal was begun in September, 1953, and is now in its second volume. Its contents are concerned principally with the culture, pests and diseases, utilization, and botany of the oil palm *Elaeis guineensis.*

Among articles that may be of especial interest are "Observations on the influence of some ecological factors on the incidence of oil palm diseases in Nigeria" by J. M. Waterston (vol. 1: 24-59. 1953) which provides a lengthy appendix listing fungi which occur on oil palms and a detailed list of references to other papers. In the same issue, pages 76-87, is an article by R. Galt entitled "Methods of germinating oil palm seeds" which describes techniques used in tropics of the Old World including descriptions of oven-type germinators and a large water-heated germinator capable of handling several hundred thousand seeds annually.

"Bronze leaf wilt of coconut palms in Nigeria" is the subject of R. A. Bull in vol. 2: 70-72, 1955. "Leaf diseases of oil palm seedlings" by J. S. Robertson, vol. 2: 110-122, illustrates leaves affected by several types of anthracnose in color and suggests control measures for anthracnose and "freckle" by spraying with copper fungicides which must be used with precaution to avoid "copper burn." A further report by Robertson on "freckle" appears in vol. 2: 265-271, 1957.

Individual issues of the journal (of which seven have thus far appeared) may be purchased from the Director, West African Institute for Oil Palm Research, Nr. Benin City, Nigeria, or the Crown Agents for Overseas Governments and Administrations, 4 Millbank, London, S.W. 1, for two shillings and sixpence (about 35 cents).

Other articles briefly noted are:

Burret, M., Kritische Bemerkungen zu einigen Palmengattungen. *Willdenowia* 1:57-58. 1953.

———, Systematisch Übersicht über die Gruppen der Palmen, *op. cit.* 350-385.

Burret, M. & Potztal, E., Bemerkungen zu einigen Palmengattungen. *Willdenowia* 1: 348-349. 1956.

———, Systematische Übersicht über die Palmen, *op. cit.* 350-385.

———Microcoelum, eine neue Palmengattung *(Cocoideae)*, op. cit. 386-388.

———, Bemerkungen zu den Palmengattungen *Liberbaileya, Maxburretia* und *Symphyogyne, op. cit.* 529-530.

The above are all written in German and consist principally of technical studies and of keys to the various groups and genera of palms, these last complete in the two articles "Systematisch Übersicht . . . "

A commentary in English on the name for *Phoenix Roebelenii* is

Moore, H. E., *Phoenix Roebelenii* and *Phoenix Loureiri*, Baileya 1: 25-30, *figs.* 14-15. 1953.

Classified Section

Reports are being received of some interesting results from classified advertisements in PRINCIPES. Send in your ad and find out if it works for you. Rates: 25c per line or part line, minimum $1.00. Pay Mr. Nat De Leon, treasurer, after publication.

WANTED: Palm seed. Send your list. Can import. Also need seedlings of many varieties. Will buy in quantity. Liners of *Rhapis excelsa, R. humilis.* J. A. Bateman, Box 114, Slidell, La.

FOR SALE: Beautiful Florida home with swimming pool and extensive tropical gardens consisting of tropical and semi-tropical plants including many fine palm specimens; completely landscaped, sprinklered, with own greenhouse, slathouse and other garden buildings. Located on East Coast of Florida, near ocean and river. In exclusive residential community. Photographs and other pertinent information available upon request. OWNER, C/o The Palm Society, 7229 S.W. 54th Ave., Miami, Florida.

RHYTICOCOS AMARA, Dominican Palm. Strong plants in gal. cans, 15-18 inches high, $5.00 postpaid in Florida, extra for longer distances. We have several other interesting items. Write or come see us. REASONER'S TROPICAL NURSERIES, P.O. Box 828, BRADENTON, FLA.

WANTED TO BUY: Plants with a foot or more of woody trunk of any species Coccothrinax, Thrinax, and Copernicia except *Thrinax parviflora* and *Coccothrinax argentata.* Address XYZ, C/o The Palm Society.

The Society has a few sets of the Bulletins, Nos. 1-6, mimeographed, which were issued before PRINCIPES was started. There is some valuable information in them, such as "The Andean Wax Palms," "Ganoderma sulcata, or Butt Rot of Palms," "Phoenix Palms in the Houston Area," "Two Hardy Palms," "Doum Palms," etc. These Bulletins are being offered to members at a service charge of $1.00 per set, to cover handling and mailing costs. Address the Executive Secretary, 7229 S.W. 54th Ave., Miami 43, Fla.

PRINCIPES, Vol. I, No. 1, is out of print. We need copies for libraries and institutions who wish to bind the complete volume. If you have an extra copy, or one you can spare, please donate it to the Society.

Fig. 28. At Soledad, Cuba, where climbers cut *palmiche*, an avenue of royal palms planted from wildlings five to ten years old between 1920 and 1925 leads to the Atkins Garden. Photo by Nixon Smiley.